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Abstract

NEUTRON-PHYSICAL CHARACTERISTICS OF ZIRCONIUM HYDRIDE-MODERATED SYSTEMS

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The work contains the results of experimental and theoretical research of physical clusters with zirconium hydride moderator and highly enriched uranium.

The studied clusters are a system of alternating layers of fuel and moderator. The flat-type fuel elements consist of teflon-4 mixed with uranous-uranic oxide of 90% enrichment. The moderator blocks made up of zirconium hydride ZrHn with various content of hydrogen are shaped and sized so as to ensure arrangement of moderator in layers of different thickness.

The required information on the properties of such reactor system was obtained by carrying out critical experiments and by taking measurements on critical clusters.

The results of the critical experiments with unreflected systems ZrHn + U^{235} have been generalized and presented in the form of diagram $\mathcal{L}$ - C ($\mathcal{L}$ -material buckling, C - con-

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centration).

The effect of fissionable substance self-shielding on the reactor critical parameters has been studied.

Efficiency of various reflectors (Be, BeO, ZrHn) has been analized.

Experiments are described devoted to studying the effect of various absorbers uniformly distributed in the core volume on the critical parameters.

The neutron spectral characteristics in the tested clusters have been measured. The results of measurements taken for determination of space distribution of neutrons in reactor volume and in core cell are cited.

The proper method for carrying out neutron-physical calculations of such quasi-homogenous reactor systems with zirconium hydride moderator has been selected.

Comparison is drawn between the calculated and experimental data.